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SELECTIVE AND MULTIPLE SCAN OUTPUTS

HP INC

Selective and Multiple Scan outputs

Abstract

The present paper proposes three new solutions to provide an enhanced and unique user experience for document scanning.

Some printers have larger control panels and thus support cropping of scanner output using an on-device preview feature. Some printers, however, may not be able to access such an on-device scan cropping feature, such as due to control panel limitations, such as limited screen space, by way of example.

In this paper, a simple, unique and cost effective approach to enhancing scan user experiences is proposed to enable users to:

- Scan a part (sub-area) of an input print media
- Scan multiple parts of a print media to generate multiple discrete scan image files
- Scan multiple documents placed in a scan bed or automatic document feeder (ADF) to multiple discrete scan image files

Background

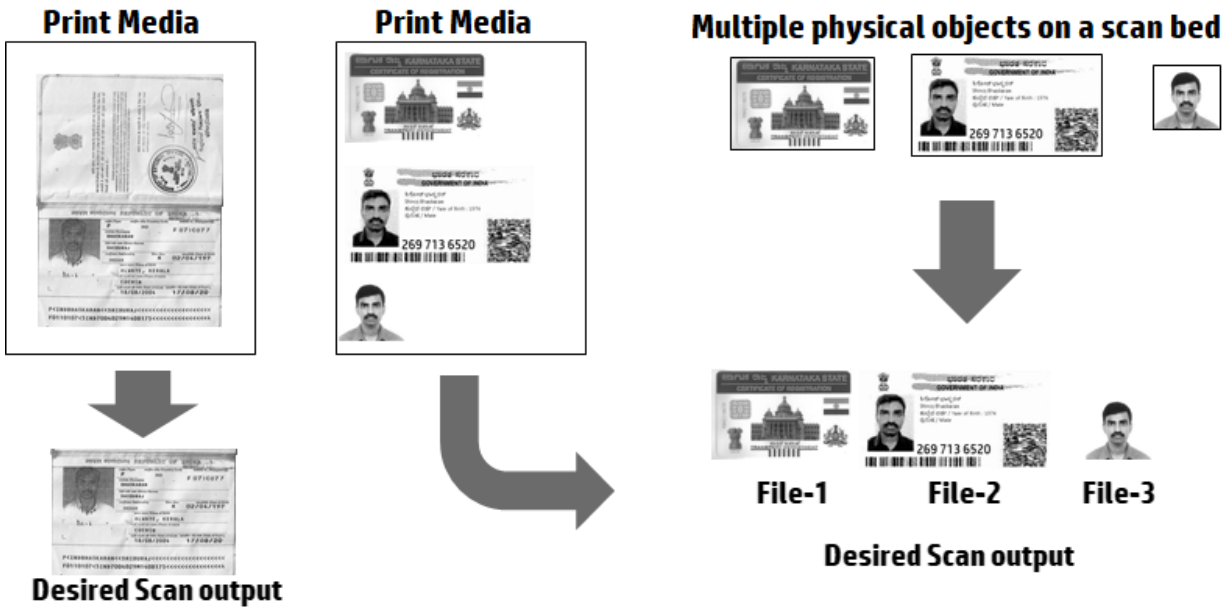


Figure 1

This paper address three current approaches for scan handling.

1. In the first example, to achieve a scan image file containing only a desired sub-area might mean cropping an original scan file on a different device (client

computer) or physically cutting undesirable parts of an original copy away unless native scan cropping support is provided by the printer.

2. In the second example, to achieve multiple scan image files, each containing multiple discrete scan images, from an original scan including multiple sub-parts, an original scan file might have to be cropped on a different device multiple times to yield the different files.
3. In the third example, to achieve multiple scan image files, each containing multiple discrete scan images, from multiple objects on a scan bed, an original scan file might have to be cropped on a different device multiple times to yield the different files. For example, to scan different objects, such as an ID card, a driver's license, and a photo, three different scan jobs may have to be performed (or one scan job and three files manually created on a different device).

All the above issues are applicable to 'Copy' functionality also.

Proposals

In this paper, we propose a new Scan and Copy option in a control panel user interface (UI) of a printer. This scan/copy setting will look for markings on original document and use those markings in order to perform functionality, such as cropping, sub-area scanning, and generation of multiple image files without having to use another device or access other printer functionality.

Idea-1 (marking-based sub-area scan/copy):

Input media can be marked (such as with 'X') to indicate a sub-area to be scanned or copied. The markings may take a number of different forms including hash marks and the like, as supported by the scan/copy mode.

Figure 2

Idea-2.a (marking-based multiple file generation):

Input media sub-areas can be marked to indicate sub-areas to be scanned to generate different image files. Numbers at opposing corners of a sub-area are used in this example to indicate sub-areas to be scanned to generate different image files, without limitation.

Figure 3 Solution 2

Idea-2.b (algorithm-based multiple file generation):

The user will let the printer decide the segmentation. There will be an algorithm decide the segments (sub areas / different artifacts) and it will do the segmentation and create different outputs (separate scan images or separate copy outputs). The algorithm is explained in the next page.

Algorithm

Device image processer functionality to look for possible objects using polygonal segmentation (e.g., rectangular segments).

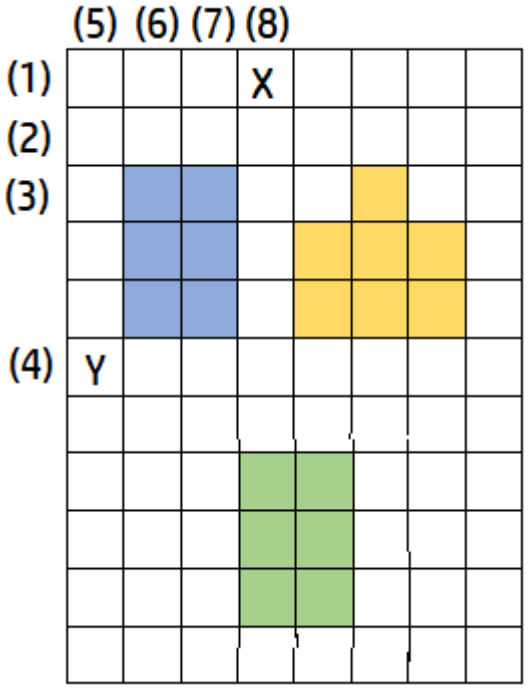
The segmentation will happen in rectangles. No odd shape segmentation will be possible with this algorithm.

Assume that the scanned image is divided as a table of pixels and has ‘R’ number of rows and ‘C’ number of columns.

1,1	1,2	…	…			1,C
2,1	2,2	…	…			2,C
…						
…						
R,1	R,2	…	…			R,C

Each cell (1,1 1,2 R,3 etc) will be either blank/white or can have some content.

The first segment will have starting point (1,1). This will be top-left corner of the grid.
A row wise search will be done for a non-white cell. Once it is found, the search will continue until a row is reached which is full of white cells. Assume the row is R_n.
Now column wise search will be done (only up to row R_n) until a column with full of white cells is found. Assume it is C_m.
Now the first segment will be the rectangle [(1,1) to R_n,C_m)].
Now the same algorithm will start from (R_{n+1},1) and also from (1, C_{m+1})
This will go on until the entire page is covered.



(1) Skipping white row as no non-white cell is found yet
(2) Skipping white row as no non-white cell is found yet
(3) Found first non-white cell
(4) Skipping subsequent rows as it has some non-white cells and found first full white row
Now will search column wise until the above row only (not full column)
(5) Skipping white row as no non-white cell is found yet
(6) Found first non-white cell
(7) Again at least one non-white cell
(8) First full white column (thought the Green cell is there, the search is only till the first full white row.
(9) Now the segment is found for **blue** image.
(10)Same will now start from the points X & Y mentioned in the picture.

Idea-3:

The user will have to let the printer decide the segmentation.

The scanner has the capability to find the edges of different artifacts kept. Using this information, the multiple artifacts' scan output can be crated as separate file (or copy to three different medias).

Results

- Enhanced user experience, including and saving device/scan/copy manipulation time

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